

Science

A Blueprint for Learning

The ***Blueprint for Learning*** is a companion document for the Tennessee Curriculum Standards which are located at www.tennessee.gov/education. Although the curriculum adopted by the State Board of Education in its entirety remains on the web for additional reference, this reformatted version makes the curriculum more accessible to classroom teachers.

Key features of the reformatted version are:

- All grades for each content area are provided in the same manual.
- The skills within each grade are identified as to whether they are introduced, developed, or have been mastered and are now being maintained at that level.
- The skills correlating with the state criterion referenced test (CRT) are also identified for classroom instruction.
- In the Language Arts section, the assessed skills (performance indicators) are identified not only for the state's CRT in grades 3-8 but also for the writing assessment in grades 5 and 8.
- This guide makes the planning of instruction for students with varying abilities easier to accomplish.
- Teachers can plan and work together to improve school wide student achievement through curriculum integration across content areas and grade levels.
- Teachers can identify current grade level skills as well as those needed to prepare students for the next year.

Skills are coded and identified as Introduced (I), Developing (D), State CRT and Writing Assessed (A), and Mastered and Maintained (M).

- Introduced (I) skills are new skills presented at that grade level. Even though a skill is considered introduced at a grade level, some development would also occur.
- Developing (D) skills are skills that have been introduced at a previous grade level. At this stage of development the skills are being refined and expanded.
- Assessed (A) skills are those skills that are correlated to the state performance indicators for the CRT portion of the achievement test (grades 3-8) and the writing assessment (grades 5 and 8). The identified skills are formally assessed through the CRT; however, all skills are informally assessed in the classroom.
 - For the purpose of data reporting, assessed (A) skills are grouped into categories indicating related skills and knowledge. For example, grammar, mechanics, and usage are grouped together under the grammar (G) category. Each state assessed indicator included on the Blueprint carries a legend showing that it is assessed and indicating the category in which it will be reported (e.g., Assessed/Grammar=A/G).
- Mastered and Maintained (M) indicates a skill that has been introduced, developed, and assessed. Even though a skill may be formally assessed, the development and expansion of the skill still continues.

SCIENCE **Kindergarten**

LIFE SCIENCE STANDARDS

Cell Structure and Function

The student will investigate the structure and function of plant and animal cells.

Key	Reporting Category	
I		Assemble and take apart objects to determine that most things are made up of parts.
I		Observe and describe what happens when an object is missing a part.

Interactions Between Living Things and Their Environment

The student will investigate how living things interact with one another and with nonliving elements of their environment.

I		Recognize that humans have five senses and be able to discriminate among these.
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Diversity and Adaptation Among Living Things

The student will understand that living things have characteristics that enable them to survive in their environment.

I		Know that different organisms tend to be found in different environments.
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EARTH SCIENCE STANDARDS

Earth and Its Place in the Universe

The student will investigate the structure of the universe.

I		Identify objects that appear in the day and nighttime sky.
I		Classify pictures as representative of day or night.

Atmospheric Cycles

The student will investigate the relationships among atmospheric conditions, weather, and climate.

I		Identify daily weather conditions (e.g., hot, cool, sunny, snowy, and rainy).
I		Associate clothing and activity choices with various types of weather.

Earth Resources

The student will investigate the properties, uses, and conservation of earth's resources.

I		Recognize a variety of earth materials (e.g., rocks, pebbles, and sand).
I		Classify objects as natural or manmade.

KEY

I = Introduced **D** = Developing **A** = State Assessed **M** = Mastered

REPORTING CATEGORY

SF = Structure & Function of Organisms **ME** = Motion & Forces, Forms of Energy **E** = Ecology **M** = Matter
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PHYSICAL SCIENCE STANDARDS

Forces and Motion

The student will investigate the effects of force on the movement of objects.

I		Recognize that objects can move in different directions and at different speeds.
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Structure and Properties of Matter

The student will investigate the characteristic properties of matter.

I		Describe an object according to its simple properties.
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Energy

The student will investigate energy and its uses.

I		Identify the sun as the source of earth's heat and light energy.
I		Identify different sounds and their sources.

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SCIENCE **First Grade**

LIFE SCIENCE STANDARDS

Cell Structure and Function

The student will investigate the structure and function of plant and animal cells.

Key	Reporting Category	
I		Use magnifiers to observe smaller parts of larger objects.
D		Observe and describe what happens when an object loses a part.

Interactions Between Living Things and Their Environment

The student will investigate how living things interact with one another and with nonliving elements of their environment.

D		Use the senses to explore the environment.
I		Collect information about organisms that occupy specific environments.
I		Provide examples of pollutants in a specific environment.

Food Production and Energy for Life

The student will study the basic parts of plants, investigate how plants produce food, and discover that plants and animals use food to sustain life.

I		Recognize the basic needs of living things (e.g., food, water, sunlight, and air).
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Diversity and Adaptation Among Living Things

The student will understand that living things have characteristics that enable them to survive in their environment.

I		Observe and note differences among plants and animals of the same kind.
D		Recognize the environment in which an organism is typically found.

Earth and Its Place in the Universe

The student will investigate the structure of the universe.

D		Distinguish between objects that appear in the day and nighttime sky.
I		Recognize that the moon is the closest object in the sky.
I		Recognize that there are tools for observing objects in the day and nighttime sky.
D		Observe and illustrate the position of the sun at different times of the day.
I		Recognize that shadows change length and position during the course of a day.

Atmospheric Cycles

The student will investigate the relationships among atmospheric conditions, weather, and climate.

D		Recognize that weather conditions are constantly changing.
I		Describe weather patterns associated with the seasons.

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D		Associate temperature, precipitation, and wind conditions with various types of weather.
I		Identify the appropriate tool for measuring temperature, precipitation, and wind speed/direction.

Earth Features

The student will understand that the earth has many geological features that are constantly changing.

I		Distinguish between land and water environments.
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Earth Resources

The student will investigate the properties, uses, and conservation of earth's resources.

D		Use observable properties to distinguish among a variety of earth materials.
D		Identify ways that earth resources benefit man.

PHYSICAL SCIENCE STANDARDS

Forces and Motion

The student will investigate the effects of force on the movement of objects.

D		Observe and describe how the movement of an object can be changed (e.g., push/pull, fast/slow).
I		Recognize objects that are balanced.

Structure and Properties of Matter

The student will investigate the characteristic properties of matter.

D		Compare objects according to weight, length, and size.
I		Distinguish between solids and liquids.

Interactions of Matter

The student will investigate the interactions of matter.

I		Observe and describe changes that can occur when two materials interact.
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Energy

The student will investigate energy and its uses.

D		Describe the effect of the sun's energy on different materials.
D		Classify sounds according to their basic characteristics (e.g., loud/soft, natural/man/made).

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SCIENCE **Second Grade**

LIFE SCIENCE STANDARDS

Cell Structure and Function

The student will investigate the structure and function of plant and animal cells.

Key	Reporting Category	
D		Use magnifiers to study smaller parts of animals and identify their functions.
D		Use magnifiers to observe and describe what occurs when a plant or an animal loses a specific part.

Interactions Between Living Things and Their Environment

The student will investigate how living things interact with one another and with nonliving elements of their environment.

I		Categorize objects as living or nonliving.
D		Determine how animals interact with the living and nonliving elements in their environment through the senses.
I		Determine how organisms interact with the nonliving elements of their environment.
D		Recognize different types of pollutants.

Food Production and Energy for Life

The student will study the basic parts of plants, investigate how plants produce food, and discover that plants and animals use food to sustain life.

D		Compare how plants and animals satisfy their basic requirements for life.
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Heredity and Reproduction

The student will understand the basic principles of inheritance.

I		Recognize that all living things come from other living things.
I		Match offspring with their parents.
I		Recognize that as an organism grows, its appearance may change.

Diversity and Adaptation Among Living Things

The student will understand that living things have characteristics that enable them to survive in their environment.

D		Provide specific examples of differences among animals of the same kind.
D		Classify an organism according to the environment in which it can best survive.

Biological Change

The student will understand that living things have changed over time.

I		Recognize that some plants and animals that formerly inhabited the earth are no longer present on earth.
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EARTH SCIENCE STANDARDS

Earth and Its Place in the Universe

The student will investigate the structure of the universe.

D		Recognize that there are innumerable stars in the nighttime sky that vary in brightness, color, and location.
D		Recognize that the sun is the brightest object in the sky and earth's closest star.
D		Determine the approximate time of day from the position of the sun in the sky.
I		Recognize that the phases of the moon occur in a predictable pattern.

Earth Features

The student will understand that the earth has many geological features that are constantly changing.

D		Recognize the earth's major geological features (e.g., mountains, oceans, and lakes).
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Earth Resources

The student will investigate the properties, uses, and conservation of earth's resources.

I		Recognize the components of soil and sand.
I		Observe the properties of sand and soil.
D		Identify various methods to conserve earth resources (e.g., soil, trees, and water).

PHYSICAL SCIENCE STANDARDS

Forces and Motion

The student will investigate the effects of force on the movement of objects.

D		Recognize that objects fall unless supported.
I		Identify materials that are attracted to magnets.
D		Observe how changing the amount of weight affects a balanced system.

Structure and Properties of Matter

The student will investigate the characteristic properties of matter.

D		Identify physical properties that can be used to describe a material.
D		Describe ways in which a material can be changed.

Interactions of Matter

The student will investigate the interactions of matter.

D		Recognize that when substances combine they may retain their individual properties (e.g., salt and pepper).
D		Recognize that when substances combine they may lose their individual properties (e.g., powdered drink mix with water).

Energy

The student will investigate energy and its uses.

D		Compare the heating and cooling rates of land, air, and water.
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SCIENCE **Third Grade**

LIFE SCIENCE STANDARDS

Cell Structure and Function

The student will investigate the structure and function of plant and animal cells.

Key	Reporting Category	
M		Use magnifiers to study the smaller parts of plants and identify their functions.
A	SF	Identify the part that belongs to a specific plant or animal.
M		Use magnifiers to observe and describe what occurs when a plant loses a specific part (e.g., leaves, roots).
A	SF	Identify the part that is missing from a specific plant or animal.
D		Recognize that smaller parts of organisms are essential to their well being.
A	SF	Identify the function of specific plant and animal parts.

Interactions Between Living Things and Their Environment

The student will investigate how living things interact with one another and with nonliving elements of their environment.

D		Examine an object's characteristics to determine if the object is living or nonliving.
A	E	Distinguish between living and nonliving things in an illustration.
D		Explain how plants and animals depend upon each other and the nonliving elements of an environment to meet basic needs.
A	E	Select the plants and animals found in a specific environment.
A	E	Identify the sense used to collect specific information.
D		Describe how environments are affected by various kinds of pollution.
A	E	Identify the environment that has been impacted by pollutants.

Food Production and Energy for Life

The student will study the basic parts of plants, investigate how plants produce food, and discover that plants and animals use food to sustain life.

D		Explain how animals depend on plants to meet their need for energy.
A	SF	Identify the basic needs of plants and animals.
A	SF	Recognize that animals obtain their food by eating plants or other animals.
I		Examine the major parts of plants and determine their functions.
A	SF	Recognize that plants use sunlight, water, and air for photosynthesis.

Heredity and Reproduction

The student will understand the basic principles of inheritance.

D		Recognize that organisms develop the ability to reproduce as they mature.
D		Note similarities and differences between parents and offspring.

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A	LC	Choose the diagram that depicts a parent with its offspring.
A	LC	Select the illustration that shows an adult organism.
D		Describe how an organism (e.g., frog, butterfly) changes as it matures.
A	LC	Select the illustration that shows how an organism changes as it matures.

Diversity and Adaptation Among Living Things

The student will understand that living things have characteristics that enable them to survive in their environment.

D		Provide specific examples of differences among plants of the same kind.
A	E	Identify groups of similar organisms (i.e., plants and animals).
D		Specify the features that enable a plant or animal to survive in its environment.
A	E	Identify an organism that belongs in a specific environment.
A	E	Identify the characteristics that enable a specific plant and/or animal to survive in its environment.

Biological Change

The student will understand that living things have changed over time.

A	LC	Identify an example, other than a dinosaur, of an extinct organism.
A	LC	Identify evidence used to determine that an organism previously existed.
A	LC	Match the organism to the evidence for its former existence.

EARTH SCIENCE STANDARDS

Earth and Its Place in the Universe

The student will investigate the structure of the universe.

A	SC	Choose the appropriate tool for observing a specific distant object.
D		Recognize that planets are major features of the universe.
A	SC	Identify the components of the solar system (e.g., planets, moon).
D		Explain how day and night result from the rotation of the Earth relative to the sun.
A	SC	Identify objects found in the day or nighttime sky.
A	SC	Identify the approximate time of day from a picture of the sun's position in the sky.
A	SC	Identify the four basic phases of the moon.

Atmospheric Cycles

The student will investigate the relationships among atmospheric conditions, weather, and climate.

A	SC	Select appropriate clothing for a given weather condition.
A	SC	Match the cloud type to a specific kind of weather.
D		Explain how changes in temperature, precipitation, wind speed/direction result in different weather conditions.
A	SC	Identify the season when given a description of weather, plants, and animals.
A	SC	Match temperature, precipitation, wind speed and direction, and cloud conditions with different weather conditions.

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A	SC	Identify the appropriate tools to measure temperature and precipitation.
D		Use data to prepare an illustration of a specific day's weather.

Earth Features

The student will understand that the earth has many geological features that are constantly changing.

D		Compare and contrast a variety of different landforms and bodies of water.
A	ER	Identify the labeled part of a map or illustration as a continent, ocean, lake, river, mountain, or island.
A	ER	Select the illustration that identifies a specific geological feature.
A	ER	Identify a geological feature given specific information.

Earth Resources

The student will investigate the properties, uses, and conservation of earth's resources.

I		Explain the relationship between rocks and minerals.
D		Identify common types of rocks.
D		Identify materials and resources that can be reused.
A	ER	Identify an object as natural or man-made.
A	ER	Recognize the properties used to identify specific earth materials.
A	ER	Identify methods for conserving natural resources.

PHYSICAL SCIENCE STANDARDS

Forces and Motion

The student will investigate the effects of force on the movement of objects.

I		Describe the relationship between the amount of force applied to an object and the distance the object moves.
A	ME	Identify that an unbalanced force is needed to change the direction of an object.
D		Recognize that objects move differently on different surfaces.
A	ME	Select how surface characteristics affect the movement of an object.
D		Recognize that magnets can move objects without touching them.
A	ME	Select an object that would be attracted by a magnet.
D		Describe how changing the position of an object affects a balanced system.
A	ME	Identify how weights affect a balanced scale.

Structure and Properties of Matter

The student will investigate the characteristic properties of matter.

D		Classify materials according to their physical properties.
A	M	Select an object according to a particular property.
A	M	Order objects according to a specific property (e.g., longest to shortest, heaviest to lightest).
A	M	Identify an object when given its properties.

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D		Select and use appropriate tools to observe and measure the physical properties of materials.
A	M	Identify appropriate tools for determining the weight or length of materials.

Interactions of Matter

The student will investigate the interactions of matter.

D		Explain how materials change their form, color, or texture when they are mixed, separated, or heated.
A	M	Identify the effects of mixing two types of materials (e.g., salt and pepper).
A	M	Choose features associated with physical changes.
A	M	Identify methods for separating mixtures.

Energy

The student will investigate energy and its uses.

D		Analyze data to explain the heating and cooling of land, air, and water.
A	ME	Identify the source of the Earth's heat and light energy.
A	ME	Identify the illustration that demonstrates the effects of the sun on various materials.
I		Differentiate between pitch and volume.
A	ME	Identify how sounds are produced.

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SCIENCE **Fourth Grade**

LIFE SCIENCE STANDARDS

Cell Structure and Function

The student will investigate the structure and function of plant and animal cells.

Key	Reporting Category	
I		Examine a variety of plant and animal cells.
A	SF	Identify the function of specific plant and animal parts.
A	SF	Recognize the basic structure of plant and animal cells.
A	SF	Identify animal and plant cell structures and functions.

Interactions Between Living Things and Their Environment

The student will investigate how living things interact with one another and with nonliving elements of their environment.

I		Examine and relate how plants and animals interact with each other and their environment.
A	E	Select plants and animals found in a specific environment.
A	E	Recognize how plants and animals interact with each other in their environment.
I		Provide evidence and give examples of environmental changes caused by living things.
A	E	Identify ways that organisms affect their environment.

Food Production and Energy for Life

The student will study the basic parts of plants, investigate how plants produce food, and discover that plants and animals use food to sustain life.

D		Explain that animals must obtain food and use food for energy.
A	SF	Compare how various animals obtain and use food for energy.
A	SF	Match the edible parts of plants with particular plant structures.
D		Compare how specific animals obtain oxygen (e.g., gills, lungs).
A	SF	Match the animal with their means of obtaining oxygen.

Heredity and Reproduction

The student will understand the basic principles of inheritance.

D		Compare the traits of offspring with those of the parent.
A	LC	Distinguish offspring from the parent.
A	LC	Recognize the relationship between reproduction and the survival of a species.
D		Describe the life cycle of an animal (i.e., frog, mealworm).
A	LC	Select the illustration that depicts the life cycle of a specific organism.

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Diversity and Adaptation Among Living Things

The student will understand that living things have characteristics that enable them to survive in their environment.

D		Classify animals according to their characteristics.
A	E	Match a plant or animal adaptation to a particular environmental condition.
A	E	Compare and contrast groups of organisms according to their major features.
A	E	Match the form of structures found in living things to their function.

Biological Change

The student will understand that living things have changed over time.

D		Examine fossils and explain how they provide information about the types of organisms that lived in the past.
A	LC	Match fossil evidence with organisms that are alive today.
A	LC	Identify animal and plant populations as thriving, threatened, endangered, or extinct.
A	LC	Infer possible causes of extinction.

EARTH SCIENCE STANDARDS

Earth and Its Place in the Universe

The student will investigate the structure of the universe.

D		Identify and order the planets in the solar system by their distance from the sun.
A	SC	Determine the order of the planets according to their distance from the sun.
A	SC	Recognize that the length and position of a shadow are related to the location of the sun.
D		Demonstrate how the earth rotates and revolves.
D		Simulate the changing shape of the moon.
A	SC	Identify the phases of the moon in the correct sequence.

Atmospheric Cycles

The student will investigate the relationships among atmospheric conditions, weather, and climate.

D		Identify and use the proper tools to measure atmospheric conditions (i.e., barometer, thermometer, anemometer, and rain gauge).
A	SC	Identify the cloud type(s) associated with specific weather conditions.
A	SC	Choose the appropriate instrument for measuring a given atmospheric condition.
I		Describe how oceans affect weather and climate.
A	SC	Identify the basic features of the water cycle.

Earth Features

The student will understand that the earth has many geological features that are constantly changing.

I		Observe and describe how wind and water change the earth's geological features.
A	ER	Recognize specific geological features.

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A	ER	Determine how wind and water change the earth's geological features
I		Identify the earth's layers.
A	ER	Identify the layers of the earth.

Earth Resources

The student will investigate the properties, uses, and conservation of earth's resources.

D		Classify earth materials according to their use.
A	ER	Choose the appropriate use for an earth material.
I		Identify the different components of soil.
A	ER	Identify the basic characteristics of soil.
A	ER	Distinguish between renewable and nonrenewable resources.

PHYSICAL SCIENCE STANDARDS

Forces and Motion

The student will investigate the effects of force on the movement of objects.

A	ME	Recognize the effects of gravity.
A	ME	Select factors that have the greatest effect on the motion of an object.
A	ME	Determine how speed affects distance traveled over time.
A	ME	Recognize simple machines (i.e., inclined plane, lever, and pulley)
I		Identify factors that affect the amount of friction.

Structure and Properties of Matter

The student will investigate the characteristic properties of matter.

M		Describe and compare observations made of objects using the naked eye, magnifying glass, and microscope.
M		Describe matter by its observable physical properties (i.e., color, shape, texture, weight, volume, and length).
A	M	Select an object according to its observable physical properties.
A	M	Identify states of matter.
A	M	Determine how various types of matter change state.

Interactions of Matter

The student will investigate the interactions of matter.

A	M	Choose features associated with physical changes.
A	M	Identify characteristics of different types of mixtures.
A	M	Determine methods for separating mixtures.

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Energy

The student will investigate energy and its uses.

A	ME	Identify different forms of energy.
I		Describe how light behaves when it strikes different surfaces.
I		Explain how the volume and pitch of sound are controlled.
A	ME	Distinguish between the volume and the pitch of sound.
I		Construct and explain a simple electrical circuit.
A	ME	Select a simple electrical circuit.
I		Categorize materials as conductors or insulators.
A	ME	Recognize that various materials conduct heat.

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Note: "A" indicates the state curriculum (CRT) assessment only.
All the skills ("I"... "D"... "A"... "M") are addressed in the classroom assessment.

SCIENCE **Fifth Grade**

LIFE SCIENCE STANDARDS

Cell Structure and Function

The student will investigate the structure and function of plant and animal cells.

Key	Reporting Category	
D		Draw and label the basic structures of plant and animal cells (i.e., cell wall, cell membrane, cytoplasm, nucleus, and chloroplasts).
D		Compare and contrast the basic structures of plant and animal cells (i.e., cell membrane, cytoplasm, and nucleus)
A	SF	Identify basic structures of plant and animal cells.
A	SF	Compare and contrast basic structures and functions of plant and animal cells.
A	SF	Distinguish between single cell and multicellular organisms.
I		Differentiate among cells, tissues, organs, and systems.

Interactions Between Living Things and Their Environment

The student will investigate how living things interact with one another and with nonliving elements of their environment.

D		Classify specific kinds of relationships among plants and animals within an ecosystem.
A	E	Determine various types of plant and animal relationships within an ecosystem.
D		Predict the consequences of a human action on the environment.
A	E	Identify environmental changes caused by living things.
A	E	Predict the effects of human actions and/or natural disasters on the environment.

Food Production and Energy for Life

The student will study the basic parts of plants, investigate how plants produce food, and discover that plants and animals use food to sustain life.

I		Describe how various plant structures are associated with food production (i.e., stems, leaves, and stomata).
A	SF	Match plant structures with their functions.
A	SF	Identify photosynthesis as the food manufacturing process in plants.
A	SF	Identify what plants need (i.e., water, sunlight, and carbon dioxide) to manufacture food.

Heredity and Reproduction

The student will understand the basic principles of inheritance.

I		Explain the function of the flower in plant reproduction.
I		Observe specific plants and explain how they grow from and produce seeds (i.e., sunflowers, and beans).
I		Compare and contrast how different plants reproduce (i.e., flowers and spores).
D		Recognize that new generations of living things arise through reproduction.
A	LC	Compare the traits of parents and their offspring.

KEY

I = Introduced D = Developing A = State Assessed M = Mastered

REPORTING CATEGORY

SF = Structure & Function of Organisms ME = Motion & Forces, Forms of Energy E = Ecology M = Matter
LC = Life Cycles & Biological Change ER = Earth Features & Resources SC = Space, Weather, & Climate

Note: "A" indicates the state curriculum (CRT) assessment only.
All the skills ("I"... "D"... "A"... "M") are addressed in the classroom assessment.

A	LC	Infer the importance of reproduction to the survival of a species.
D		Describe the life cycle of a fast growing plant.
A	LC	Recognize the difference between complete and incomplete metamorphosis.

Diversity and Adaptation Among Living Things

The student will understand that living things have characteristics that enable them to survive in their environment.

D		Classify plants according to their characteristics.
A	E	Match the form with the function of structures in living things.
D		Compare how plants are adapted to different environments (e.g., palm tree, fir tree, and cactus).
A	E	Compare how organisms adapt to different environments.
A	E	Identify adaptations that enhance the survival of organisms in an environment.
A	E	Determine which organisms are likely to survive in a particular environment.

Biological Change

The student will understand that living things have characteristics that enable them to survive in their environment.

D		Explain how fossils provide information about the past.
A	LC	Compare the causes that led to the extinction of various organisms.
A	LC	Analyze how fossils provide information about the past.
A	LC	Compare the relative age of fossils in rock layers.

EARTH SCIENCE STANDARDS

Earth and Its Place in the Universe

The student will investigate the structure of the universe.

A	SC	Distinguish among the planets according to specific characteristics.
M		Demonstrate how moon phases occur.
D		Explain why the moon appears to change shape.
A	SC	Identify and arrange the phases of the moon in the correct sequence.
D		Explain the difference between rotation and revolution in the solar system.
A	SC	Identify the force that pulls objects toward the Earth.
A	SC	Differentiate between the Earth's rotation and its revolution.
A	SC	Recognize that the appearance of an object in the sky is affected by its size, motion, and distance from the Earth.

Atmospheric Cycles

The student will investigate the relationships among atmospheric conditions, weather, and climate.

I		Analyze data obtained from studies of atmospheric conditions (i.e., air pressure, wind speed, and precipitation).
A	SC	Distinguish between weather and climate.
A	SC	Predict weather conditions based on an analysis of atmospheric data.

KEY

I = Introduced **D** = Developing **A** = State Assessed **M** = Mastered

REPORTING CATEGORY

SF = Structure & Function of Organisms **ME** = Motion & Forces, Forms of Energy **E** = Ecology **M** = Matter
LC = Life Cycles & Biological Change **ER** = Earth Features & Resources **SC** = Space, Weather, & Climate

Note: "A" indicates the state curriculum (CRT) assessment only.
All the skills ("I"... "D"... "A"... "M") are addressed in the classroom assessment.

I		Explain the effects of landforms on weather and climate.
A	SC	Identify how various geographic features affect weather and climate.
D		Demonstrate the components and processes of the water cycle.
A	SC	Identify the basic features of the water cycle.
I		Analyze how temperature affects evaporation, condensation and precipitation.

Earth Features

The student will understand that the earth has many geological features that are constantly changing.

D		Explain how certain forces cause changes in the earth's geological features (i.e., wind, water, and plate tectonics).
A	ER	Identify forces that cause geological change.
D		Construct a model that depicts the layers of the earth.
A	ER	Recognize that the age of Earth materials can be determined by their position in rock layers.
A	ER	Identify characteristics of the earth's layers.

Earth Resources

The student will investigate the properties, uses, and conservation of earth's resources.

D		Choose the appropriate use for an earth material (e.g., fuel, monument, and house foundation).
A	ER	Select a diagram that illustrates the most appropriate use of an earth material.
D		Describe the process of soil formation.
A	ER	Select the soil characteristics that best support plant growth.
A	ER	Recognize the impact of society's use of nonrenewable resources over time.

PHYSICAL SCIENCE STANDARDS

Forces and Motion

The student will investigate the effects of force on the movement of objects.

D		Explain the effect that gravity has on objects found on earth.
A	ME	Identify the effect that gravity has on objects found on or near the earth's surface.
D		Explain the relationships among mass, force, and distance traveled.
I		Explain the relationship between slope and the amount of force.
A	ME	Determine the effect of slope and friction on the speed of an object.
D		Explore and explain the use of simple machines.
A	ME	Match simple machines with their uses.
D		Explore and explain how friction affects motion.

KEY

I = Introduced **D** = Developing **A** = State Assessed **M** = Mastered

REPORTING CATEGORY

SF = Structure & Function of Organisms **ME** = Motion & Forces, Forms of Energy **E** = Ecology **M** = Matter
LC = Life Cycles & Biological Change **ER** = Earth Features & Resources **SC** = Space, Weather, & Climate

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Structure and Properties of Matter

The student will investigate the characteristic properties of matter.

A	M	Select a material according to a description of its physical properties.
A	M	Determine the appropriate metric unit of measurement for specific properties of matter.
A	M	Recognize the law of conservation of matter.
D		Describe how evaporation and condensation occur as a result of temperature change.
D		Explain why different types of matter freeze, melt, and/or evaporate at different rates.
A	M	Recognize how heat loss or gain is associated with a change in the state of matter.

Interactions of Matter

The student will investigate the interactions of matter.

I		Identify conditions associated with a chemical change.
A	M	Distinguish between physical and chemical changes.
A	M	Compare the effect of physical and chemical changes on matter.
A	M	Identify a substance as an acid (i.e., vinegar or lemon juice) or a base (i.e., soap or baking soda).

Energy

The student will investigate energy and its uses.

A	ME	Recognize how various materials conduct heat.
D		Demonstrate and explain how energy can change form.
A	ME	Differentiate between potential and kinetic energy.
A	ME	Identify ways that energy is transferred.
D		Observe and describe how lenses affect a beam of light.
A	ME	Select the illustration that depicts how lenses refract light.
D		Explore and describe the uses of magnets.
A	ME	Identify the poles of a magnet.
A	ME	Identify the description of a magnetic field.
I		Construct and explain a parallel circuit.
A	ME	Distinguish between series and parallel circuits.
D		Explain the use of a specific type of electrical circuit.

KEY

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REPORTING CATEGORY

SF = Structure & Function of Organisms **ME** = Motion & Forces, Forms of Energy **E** = Ecology **M** = Matter
LC = Life Cycles & Biological Change **ER** = Earth Features & Resources **SC** = Space, Weather, & Climate

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All the skills ("I"... "D"... "A"... "M") are addressed in the classroom assessment.

SCIENCE ***Sixth Grade***

LIFE SCIENCE STANDARDS

Interactions Between Living Things and Their Environment

The student will investigate how living things interact with one another and with nonliving elements of their environment.

Key	Reporting Category	
A	IL	Distinguish between commensalism, parasitism, and mutualism.
D		Distinguish between predators and prey.
A	IL	Recognize how animals and plants are interdependent.
A	IL	Predict whether an organism can survive in a particular ecosystem.
D		Interpret how humans impact ecosystems.

Food Production and Energy for Life

The student will study the basic parts of plants, investigate how plants produce food, and discover that plants and animals use food to sustain life.

D		Classify organisms as producers, consumers, or decomposers.
A	FP	Identify how organisms obtain food for energy.
A	FP	Classify organisms as producers, consumers, or decomposers in a food chain or food web.
D		Demonstrate interrelationships among organisms in a food chain or food web.
A	FP	Infer the consequences of a change in the population size of an organism in a food chain or food web.

Diversity and Adaptation Among Living Things

The student will understand that living things have characteristics that enable them to survive in their environment.

D		Explain how the relationship between the form and function of an organism is associated with survival in a given environment.
A	DA	Identify adaptations that enhance the survival of organisms in an environment.
A	DA	Determine which organisms are likely to survive in a particular environment.
A	DA	Classify plants and animals according to their features.

Biological Change

The student will understand that living things have changed over time.

A	BC	Analyze how fossils provide information about the past.
A	BC	Differentiate between the relative age of fossils in a sedimentary rock diagram.
I		Determine the geologic age of an object using a diagram or a time line.
D		Identify additional lines of scientific evidence, other than fossils, that support the idea of change over time.
A	BC	Select additional lines of scientific evidence, other than fossils, that illustrate change over time.
D		Predict how a specific environmental change might affect the survival of a plant or animal species.
D		Evaluate possible causes of extinction.

KEY

I = Introduced D = Developing A = State Assessed M = Mastered

REPORTING CATEGORY

IL = Interaction & Environment FP = Food Production & Energy DA = Diversity & Adaptation
BC = Biological Change EU = Earth & Its Place in the Universe E = Energy

Note: "A" indicates the state curriculum (CRT) assessment only.
All the skills ("I"... "D"... "A"... "M") are addressed in the classroom assessment.

A	BC	Identify factors that contribute to extinction.
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EARTH SCIENCE STANDARDS

Earth and Its Place in the Universe

The student will investigate the structure of the universe.

D		Differentiate among the components of the universe.
A	EU	Categorize the components of the universe (i.e., stars, planets, comets, asteroids, and meteors).
A	EU	Differentiate between planets according to specific characteristics.
D		Construct a model of the solar system.
D		Illustrate the positions of the Earth, moon, and sun during solar and lunar eclipses.
D		Use a model to explain how the tilt of the Earth and its revolution around the sun causes the seasons.
A	EU	Distinguish between a day, month, and year based on the movements of the Earth, sun, and moon.
A	EU	Differentiate between a solar and a lunar eclipse.
A	EU	Select the diagram that reflects the Earth/sun relationship that accounts for the four seasons.
D		Identify the pull of gravity as the force that holds the planets and their moons in orbit.
A	EU	Identify the force that pulls objects toward the Earth.
I		Relate tidal conditions with the position of the moon.
A	EU	Predict the type of tide produced by the different positions of the Earth and moon system.
I		Make use of available resources (internet, library, interviews, etc.) to research careers associated with technology and space exploration.

PHYSICAL SCIENCE STANDARDS

Energy

The student will investigate energy and its uses.

D		Recognize the basic parts of a wave.
A	E	Identify the wavelength, frequency, and amplitude of a wave.
D		Explain how the properties of sound are related to wavelength, frequency, and amplitude.
A	E	Predict the direction of heat flow between objects.
I		Explain the difference between the Fahrenheit and Celsius temperature scales.
D		Explain how magnets are involved in the production of electricity.
D		Distinguish among heat, chemical, electrical, and mechanical energy.
I		Understand the law of conservation of energy.
A	E	Recognize a variety of energy transformations.
A	E	Infer the impact of nuclear power on humans and the environment.
D		Describe the electromagnetic spectrum.
A	E	Select examples of refraction, reflection, and absorption of light.
I		Compare incandescent and fluorescent light with respect to production and efficiency.

KEY

I = Introduced D = Developing A = State Assessed M = Mastered

REPORTING CATEGORY

IL = Interaction & Environment FP = Food Production & Energy DA = Diversity & Adaptation
BC = Biological Change EU = Earth & Its Place in the Universe E = Energy

Note: "A" indicates the state curriculum (CRT) assessment only.
All the skills ("I"... "D"... "A"... "M") are addressed in the classroom assessment.

SCIENCE **Seventh Grade**

LIFE SCIENCE STANDARDS

Cell Structure and Function

The student will investigate the structure and function of plant and animal cells.

Key	Reporting Category	
D		Design and construct a hierarchy among cells, tissues, organs, and systems.
A	CS	Determine the relationships among cells, tissues, organs, and systems given a diagram and identify the function of organ systems.
A	CS	Recognize basic structures that most cells share (i.e., nucleus, cytoplasm, and cell membrane).
A	CS	Distinguish between plant and animal cells.
A	CS	Identify major cell organelles and their functions.
D		Sequence a series of diagrams depicting the stages of cell division in plant and animal cells.
A	CS	Sequence a series of diagrams depicting the movement of chromosomes during mitosis.
I		Design models to illustrate how materials move between cells and their environment.
A	CS	Predict the movement of substances through osmosis or diffusion across the cell membrane, given solutions of different concentrations.

Food Production and Energy for Life

The student will study the basic parts of plants, investigate how plants produce food, and discover that plants and animals use food to sustain life.

D		Compare and contrast photosynthesis and respiration.
A	FP	Determine what plants need to make food.
A	FP	Identify photosynthesis as the food making process in plants.
A	FP	Identify the reactants and products of photosynthesis and respiration.
D		Relate the processes of photosynthesis and respiration to appropriate cellular organelles.
A	FP	Associate the processes of photosynthesis and respiration with appropriate cellular organelles.
D		Diagram and explain how oxygen and carbon dioxide are exchanged between living things and their environment.
A	FP	Select the structures that animals use to obtain oxygen.
A	FP	Classify animals according to their means of obtaining oxygen.
A	FP	Select the illustration that depicts the movement of oxygen and carbon dioxide between living things and their environment.
A	FP	Interpret a diagram depicting the oxygen-carbon dioxide cycle.

KEY

I = Introduced D = Developing A = State Assessed M = Mastered

REPORTING CATEGORY

CS = Cell Structure & Function FP = Food Production & Energy HR = Heredity & Reproduction
AC = Atmospheric Cycles SP = Structure & Properties

Note: "A" indicates the state curriculum (CRT) assessment only.
All the skills ("I"... "D"... "A"... "M") are addressed in the classroom assessment.

Heredity and Reproduction

The student will understand the basic principles of inheritance.

A	HR	Match a flower part with its reproductive function.
A	HR	Distinguish between sexual and asexual methods of reproduction.
D		Recognize that genetic information is passed from parent to offspring during reproduction.
A	HR	Recognize advantages and disadvantages of sexual and asexual reproduction.
A	HR	Recognize a variety of pollination methods and associated floral adaptations.

Earth Science Standard

Atmospheric Cycles

The student will investigate the relationships among atmospheric conditions, weather, and climate.

D		Explain how conditions, such as the amount of precipitation, temperature, and wind speed affect the water cycle.
A	AC	Determine how temperature affects evaporation and condensation in the atmosphere.
A	AC	Identify the detailed features of the water cycle given a diagram (i.e., evaporation, condensation, precipitation, run-off, and transpiration).
D		Record and analyze meteorological data to predict weather patterns.
D		Use diagrams to demonstrate how atmospheric winds and ocean currents affect weather and climate.
A	AC	Analyze data and make predictions about weather given a scenario.
A	AC	Interpret weather data using a weather map.
I		Explain the impact of catastrophic events on climate (e.g., volcanic eruption).
I		Research careers related to meteorology.

Physical Science Standard

Structure and Properties of Matter

The student will investigate the characteristic properties of matter.

D		Differentiate among elements, compounds, and mixtures.
A	SP	Distinguish between elements, compounds, and mixtures (i.e., Na, Cl, NaCl, C, O ₂ , CO ₂ , H ₂ , and H ₂ O).
D		Describe the particle arrangement associated with different states of matter.
A	SP	Compare the motion and arrangement of molecules in solids, liquids, and gases.
D		Identify the mass, volume, density, boiling point, melting point, and solubility of a given substance.
D		Measure and/or calculate the mass, volume, density, and temperature of a given substance.
A	SP	Determine the measurable properties of matter and appropriate metric units (i.e., weight, mass, volume, density, size (length, width, height, and temperature).
I		Obtain information about an element with the aid of a periodic table.
A	SP	Classify substances as elements or compounds from their symbols or formulas.

KEY

I = Introduced D = Developing A = State Assessed M = Mastered

REPORTING CATEGORY

CS = Cell Structure & Function FP = Food Production & Energy HR = Heredity & Reproduction
AC = Atmospheric Cycles SP = Structure & Properties

Note: "A" indicates the state curriculum (CRT) assessment only.
All the skills ("I"... "D"... "A"... "M") are addressed in the classroom assessment.

SCIENCE ***Eighth Grade***

LIFE SCIENCE STANDARDS

Interactions Between Living Things and Their Environment

The student will investigate how living things interact with one another and with nonliving elements of their environment.

Key	Reporting Category	
D		Characterize the major biomes according to specific environmental features and identify the organisms commonly found in these areas.
A	IL	Distinguish among commensalisms, parasitism, and mutualism.
A	IL	Identify the earth's major biomes.
A	IL	Choose the appropriate biome for an organism, given a description.
A	IL	Identify biotic and abiotic factors in a biome.

Heredity and Reproduction

The student will understand the basic principles of inheritance.

A	HR	Differentiate between complete and incomplete metamorphosis.
A	HR	Distinguish between sexual and asexual methods of reproduction.
		Use the results of a test cross to distinguish between dominant and recessive traits.
A	HR	Differentiate between dominant and recessive traits.
A	HR	Predict the genotypes of offspring in a monohybrid cross using a punnett square.
I		Draw or construct a model representing the relationship among DNA, genes, and chromosomes.
A	HR	Select models or illustrations that are representations of DNA.
A	HR	Associate a change in a DNA molecule with a mutation.
A	HR	Identify types of genetic engineering (i.e., gene splicing and cloning) and evaluate the impact of genetic engineering on society.
I		Construct a simple model that represents the basic process by which reproductive cells are produced (meiosis).
I		Research and present information on careers related to biotechnology.

Diversity and Adaptation Among Living Things

The student will understand that living things have characteristics that enable them to survive in their environment.

A	DA	Identify similarities and differences among organisms.
A	DA	Classify plants and animals into groups according to their features.
A	DA	Infer the relatedness of different organisms.
A	DA	Use a simple classification key to identify an unknown organism.
A	DA	Determine the genus and species of an organism using a dichotomous key.

EARTH SCIENCE STANDARDS

Earth Features

The student will understand that the earth has many geological features that are constantly changing.

D		Differentiate among earth layers according to their physical properties.
A	EF	Label a cross section of the earth.
D		Illustrate the major plate boundaries.
A	EF	Identify the major plates of the world.
A	EF	Deduce plate movements as the major cause of geological events.
D		Compare and contrast processes that shaped the earth in the past with those shaping the earth today (e.g., plate movements, human activity, and mountain building).
A	EF	Recognize the relationship between continental drift and plate tectonics.

Earth Resources

The student will investigate the properties, uses, and conservation of earth's resources.

A	ER	Distinguish between renewable and nonrenewable resources.
D		Distinguish among common minerals found in rock samples using test kits, descriptive charts, etc.
A	ER	Identify rocks and minerals given a table of physical properties.
D		Describe how various minerals are used.
		Label a diagram depicting the processes of the rock cycle.
A	ER	Identify factors that cause rocks to break down.
A	ER	Distinguish among sedimentary, igneous, and metamorphic rocks and interpret a simple rock cycle diagram.
M		Explain how fossils are used to understand the earth's past.
A	ER	Infer that human activities may be helpful or harmful to the environment.
D		Research how technological advances have impacted the environment (e.g., the use of fertilizers, and fossil fuels).
A	ER	Identify various energy sources.
D		Analyze aspects of energy consumption by society.
D		Evaluate the effectiveness of various conservation strategies on the earth's energy and natural resources.

PHYSICAL SCIENCE STANDARDS

Forces and Motion

The student will investigate the effects of force on the movement of objects.

D		Determine the speed of an object based on the distance and amount of time traveled.
D		Differentiate between speed and velocity.
A	FM	Recognize that forces cause changes in speed and/or direction of motion.
A	FM	Solve problems pertaining to distance, speed, velocity, and time given illustrations, diagrams, graphs, or scenarios.
D		Describe how Newton's three laws of motion explain the movement of objects.
A	FM	Recognize the relationship between mass, force, and acceleration.
A	FM	Identify Newton's three laws of motion and relate the first two laws to the concepts of inertia and momentum.
D		Distinguish between mass and weight.
D		Describe the relationship among distance, size, mass, and gravitational force of objects.
A	FM	Identify the relationship between the mass of objects, the distance between them, and the amount of gravitational

		attraction.
D		Differentiate among the six types of simple machines and their applications.
A	FM	Identify simple machines.
A	FM	Choose the most appropriate simple machine to use for a specific task.

Interactions of Matter

The student will investigate the interactions of matter.

D		Determine whether a substance is an acid or base using an indicator.
A	IM	Identify substance as an acid or a base, given its pH.
A	IM	Distinguish between physical and chemical changes.
		Recognize that oxygen, in combination with another substance, results in a chemical change.
D		Identify the reactants and/or products in a chemical change.
		Explain why the mass of the reactants is the same as the mass of the products during a chemical change.
A	IM	Recognize that the mass of the reactants is the same as the mass of the products, given simple chemical equations.
		Describe how variables such as temperature and concentration affect the rate of reaction.
A	IM	Determine how temperature and concentration might affect the rate of chemical reactions.
A	IM	Classify a reaction as exothermic or endothermic.

Gateway

Gateway Science		
Standard Number:		1.0 Cells
Performance Indicators	Reporting	As documented through state assessment -
State:	Category	
A	CB	At Level 1, the student is able to <ul style="list-style-type: none"> identify major cell organelles, given a diagram; distinguish between plant and animal cells, given diagrams or scenarios; predict the movement of water molecules across the cell membrane, given solutions of different concentrations; sequence a series of diagrams depicting the movement of chromosomes during mitosis; compare and contrast the cell cycle in plant and animal cells, given a diagram or description.
A	CB	
A	CP	
A	CP	
A	CP	
A	CB	At Level 2, the student is able to <ul style="list-style-type: none"> distinguish proteins, carbohydrates, lipids, and nucleic acids, given structural diagrams; identify a positive test for carbohydrates and lipids when given an experimental procedure, data, and results; distinguish between active and passive transport, given examples of different molecules; evaluate the role of meiosis in maintaining genetic variability and continuity, given a scenario; determine the number of chromosomes following mitosis or meiosis, given the number of chromosomes in the original cell; recognize the significance of homeostasis to the viability of humans and other organisms, given the definition of homeostasis.
A	CB	
A	CP	
A	CP	
A	CP	
A	CB	At Level 3, the student is able to <ul style="list-style-type: none"> identify the biomolecules responsible for communicating, responding, regulating, or reproducing in the cell.
Performance Indicators		As documented through teacher observation -
Teacher:		
		At Level 1, the student is able to <ul style="list-style-type: none"> demonstrate appropriate use and care of compound light microscopes; examine plant and animal cells using compound light microscopes; create a 3-D model of a typical cell; prepare wet mount slides; demonstrate molecular movement across a semi-permeable membrane; model or observe the movement of chromosomes during mitosis in plant and animal cells; model or observe the movement of chromosomes during meiosis in plant and animal cells; research careers that relate to the study of cells, such as microscopist, cytologist, oncologist, medical technician, and biochemist; write a persuasive essay, supported by current scientific journals, to relate certain lifestyle choices to a particular disease; create a time line that traces the development of microscopes and correlates this information to cytology.

KEY

I = Introduced D = Developing A = State Assessed M = Mastered

REPORTING CATEGORY

CB = Cell Organelles and Biomolecules CP = Cell Processes IB = Interactions: Between Organisms and Behavior
 IE = Interactions Population Dynamics and Energy Flow PR= Photosynthesis and Respiration G= Genetics
 B= Biotechnology/DNA DC= Diversity: Biomes and Classification D= Diversity: Body Systems and Life Cycles

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All the skills ("I" ... "D" ... "A" ... "M") are addressed in classroom assessment.

		<p>At Level 2, the student is able to</p> <ul style="list-style-type: none"> • construct a model of each of the biomolecules, given a structural diagram; • conduct an experiment to identify carbohydrates and lipids; • prepare a slide using proper staining technique; • record nutritional intake for one week, calculating daily caloric intake for each biomolecule, and evaluate the diet to develop an improvement plan; • calculate the ratio of cell surface area to cell volume;
		<p>At Level 3, the student is able to</p> <ul style="list-style-type: none"> • design and conduct a controlled experiment to observe enzymatic actions and identify possible sources of experimental error; • conduct a test to detect the presence of proteins.

KEY

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REPORTING CATEGORY

**CB = Cell Organelles and Biomolecules CP = Cell Processes IB = Interactions: Between Organisms and Behavior
IE = Interactions Population Dynamics and Energy Flow PR= Photosynthesis and Respiration G= Genetics
B= Biotechnology/DNA DC= Diversity: Biomes and Classification D= Diversity: Body Systems and Life Cycles**

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Standard Number :		2.0 Interactions
Performance Indicators	Reporting	As documented throughout state assessment -
State:	Category	
A	IB	At Level 1, the student is able to <ul style="list-style-type: none"> identify commensalism, parasitism, and mutualism, given a scenario with examples; classify organisms as producers, consumers, or decomposers, given their behaviors and environment.
A	IB	
A	IB	At Level 2, the student is able to <ul style="list-style-type: none"> identify abiotic and biotic factors, given a description or an illustration of an ecosystem; make inferences about how environmental factors would affect population growth, given a scenario; examine the energy flow and loss through the trophic levels of an ecosystem, given an illustration of an energy pyramid; determine the effects of human activities on ecosystems, given a scenario; analyze and interpret population growth curves, given graphs.
A	IE	
A	IE	
A	IE	
A	IE	
A	IB	At Level 3, the student is able to <ul style="list-style-type: none"> distinguish between a learned and an innate behavior, given a description of that behavior in a scenario.
Performance Indicators		As documented through teacher observation -
Teacher:		
		At Level 1, the student is able to <ul style="list-style-type: none"> compare and contrast the three types of symbiotic relationships: parasitism, mutualism, and commensalism; recognize the general conditions necessary to maintain an ecosystem by constructing a model of an ecosystem; describe the niche and habitat of an organism in an ecosystem; recognize the kinds of organisms always found at the base of a food chain; identify the producers, consumers, and decomposers in a food chain; observe an outdoor habitat, identifying the abiotic and biotic factors, types of populations, producers, consumers, and decomposers; research careers that relate to the environment, such as urban planner, forester, park ranger, environmental engineer, and environmental lawyer.
		At Level 2, the student is able to <ul style="list-style-type: none"> use current publications to research examples where human influence has changed an ecosystem, communicate findings through written and/or oral presentation; investigate the impact of parasites on human population; investigate the effects of acid rain on the environment; maintain a model of an ecosystem; illustrate the flow of energy through an ecosystem from the sun to producers, consumers, and decomposers; collect data, construct and interpret population graphs to determine if the population is stable, increasing, or declining.

KEY

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 IE = Interactions Population Dynamics and Energy Flow PR= Photosynthesis and Respiration G= Genetics
 B= Biotechnology/DNA DC= Diversity: Biomes and Classification D= Diversity: Body Systems and Life Cycles

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		<p>At Level 3, the student is able to</p> <ul style="list-style-type: none"> • investigate the behaviors and adaptations of selected organisms and relate these to the survival of the species; • analyze human population graphs to infer the impact on global resources, as well as economic and political systems; • investigate factors that influence Hardy-Weinberg equilibrium; • research and evaluate the economic and political impact of recycling on nonrenewable resources.
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Standard Number:		3.0 Photosynthesis and Respiration
Performance Indicators	Reporting	As documented through state assessment -
State:	Category	
A	PR	At Level 1, the student is able to <ul style="list-style-type: none"> identify the reactants and products of photosynthesis and respiration, given the equations;
A	PR	<ul style="list-style-type: none"> identify the cell organelle in which photosynthesis occurs, given a diagram of a plant;
A	PR	<ul style="list-style-type: none"> interpret a diagram of the oxygen-carbon dioxide cycle, given a diagram.
A	PR	At Level 2, the student is able to <ul style="list-style-type: none"> distinguish between aerobic and anaerobic respiration in terms of the presence or absence of oxygen and ATP produced;
A	PR	<ul style="list-style-type: none"> relate the interdependence of the processes of photosynthesis and respiration to living organisms, given a diagram or a description.
A	PR	At Level 3, the student is able to <ul style="list-style-type: none"> recognize the transfer of energy from respiration to cellular work, given an equation or diagram of the ATP cycle.
Performance Indicators		As documented through teacher observation -
Teacher:		
		At Level 1, the student is able to <ul style="list-style-type: none"> identify and explore the chloroplasts in a leaf such as <i>Elodea</i>; construct a model or diagram of the oxygen-carbon dioxide cycle; research careers that relate to photosynthesis and respiration, such as horticulturist, brewer, environmentalist, paper manufacturer and agricultural extension agent; model or illustrate the paths of water, oxygen, nitrogen, and carbon dioxide through a plant.
		At Level 2, the student is able to <ul style="list-style-type: none"> construct charts comparing reactants, products, and energy transfer in photosynthesis and respiration; demonstrate that oxygen is made during photosynthesis in a laboratory investigation; sequence the major events of cellular respiration and anaerobic respiration; investigate the importance of fermentation to the pharmaceutical, agricultural, and food and beverage industries.
		At Level 3, the student is able to <ul style="list-style-type: none"> produce concept maps of the major events occurring in the light dependent and light independent reactions; compare the efficiency of aerobic and anaerobic respiration.

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Standard Number:		4.0 Genetics and Biotechnology
Performance Indicators	Reporting	As documented through state assessment -
State:	Category	
A G A G A G A B		At Level 1, the student is able to <ul style="list-style-type: none"> distinguish between asexual and sexual methods of reproduction, using a scenario; identify the dominant trait, given the results of a monohybrid cross in a scenario; determine the genotype and phenotype of a monohybrid cross, given a Punnet square; relate changes in the DNA instructions to cause mutations, given diagrams.
A B A G A G A B A B A G		At Level 2, the student is able to <ul style="list-style-type: none"> recognize the two major functions of DNA as replication and protein synthesis, given diagrams showing a strand of bases with a complimentary strand; identify the sex chromosomes in humans and recognize inheritance patterns that are sex-linked, using a pedigree; analyze modes of inheritance including co-dominance, incomplete dominance, polygenic, and multiple alleles using genetic problems or Punnet Squares; analyze a series of DNA bases to determine the sequence which demonstrates a mutation; describe and analyze DNA fingerprinting using an illustration of DNA bands; determine the probability of having a child with cystic fibrosis, sickle cell anemia, or Tay-Sachs if both parents are carriers, given a scenario or genetic problem.
A B A G		At Level 3, the student is able to <ul style="list-style-type: none"> differentiate the processes of transcription and translation, given diagrams; analyze a dihybrid cross given a completed Punnet square to determine the probability of a particular trait.
Performance Indicators		As documented through teacher observation -
Teacher:		
		At Level 1, the student is able to <ul style="list-style-type: none"> construct a model of DNA; construct a monohybrid cross given a genetic problem to solve; distinguish between dominant and recessive traits given the results of a monohybrid cross; research careers that relate to genetics and inheritance, such as lab technician, forensic pathologist, livestock breeder, medical doctor, and reproductive endocrinologist.
		At Level 2, the student is able to <ul style="list-style-type: none"> identify a DNA molecule when given a choice of several structural formulas; construct a chart comparing DNA with RNA for shape, functions, and molecular make-up; model the processes of replication, transcription, and translation; construct a dihybrid cross and predict genotypic and phenotypic ratios; use a microscope or hand lens to diagram and label different types of reproductive cells; participate in a classroom debate regarding the scientific and ethical issues surrounding current emerging DNA technologies and/or the Human Genome Project; model the process of recombinant DNA.

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		<p>At Level 3, the student is able to</p> <ul style="list-style-type: none"> • manipulate a model of DNA to show different types of mutation; • analyze/construct a karyotype and identify abnormalities for chromosome number, deletions, and translocations; • research a position paper defending views of the ethics of a chosen group of DNA technologies; • apply an ethical model to evaluate current and future DNA technologies including recombinant DNA.
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Standard Number:		5.0 Diversity
Performance Indicators	Reporting	As documented through state assessment -
State:	Category	
A	DC	At Level 1, the student is able to <ul style="list-style-type: none"> infer animals or plants indigenous to an environment, given pictures or diagrams of the organisms and a description of the environment; infer the biome in which an animal or plant lives, given a description of the organism and pictures of various biomes; infer the relatedness of different organisms using the Linnean system of classification, given pictures of a variety of different plants or animals and a key to classification of organisms.
A	DC	
A	DC	
A	DC	At Level 2, the student is able to <ul style="list-style-type: none"> determine the genus and species of an organism, given a dichotomous key containing descriptions of the characteristic of each classification level; determine whether an insect undergoes complete or incomplete metamorphosis, given pictures or diagrams of the insect in its stages of development; infer the body symmetry of an organism, given a diagram or picture of the organism; predict the function of a system or organ, given structural descriptions, whether in the earthworm, crayfish, frog, or human.
A	DL	
A	DL	
A	DL	
A	DL	At Level 3, the student is able to <ul style="list-style-type: none"> predict the function of an organ, given a description of its component tissues; compare and contrast life cycles of various organisms to include alternation of generations, given pictorial representations.
A	DL	
Performance Indicators		As documented through teacher observation -
Teacher:		
		At Level 1, the student is able to <ul style="list-style-type: none"> develop a rationale for a system of classification, given a group of objects to classify; examine plant and animal specimens and compare and contrast their structural components, symmetry, and life cycles; illustrate or construct a biome for specific plant and animal species by determining the needs of the organisms; predict the types of plants and animals indigenous to a biome by determining the characteristics of the biome; research careers that relate to diversity, such as farmer, zoo keeper, pest control consultant, entomologist, taxonomist, lab technician, naturalist, and botanist.
		At Level 2, the student is able to <ul style="list-style-type: none"> relate the advantages and disadvantages of various types of classification systems, including the Aristotelian, Linnean, and DNA sequencing systems; model or observe the stages of complete and incomplete metamorphosis; model or observe body plans with asymmetry, radial, and bilateral symmetry; observe or illustrate the alternation of generations in a plant or animal species; predict the function of a system or organs given the characteristics of the organs contained within that system; classify a group of organisms, given a dichotomous key with characteristics of the organisms.

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		<p>At Level 3, the student is able to</p> <ul style="list-style-type: none"> • perform comparisons using DNA sequencing to determine relative relatedness of different organisms; • compare and contrast the organs and organ systems of various species of plants and animals as relates to their structural components and the functions of the organs and systems.
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Standard Number:		6.0 Biological Evolution
Performance Indicators	Reporting	As documented through state assessment -
State:	Category	
A	IB	At Level 1, the student is able to <ul style="list-style-type: none"> differentiate between the relative age of various fossils in sedimentary rock, given a diagram of rock strata;
A	IE	
A	DC	At Level 2, the student is able to <ul style="list-style-type: none"> transfer knowledge of divergent evolution, as in Darwin's finches, to determine why species with a common ancestor have adapted differently, given a diagram of the various species;
A	DC	
A	IE	
A	B	At Level 3, the student is able to <ul style="list-style-type: none"> recognize the relatedness of species using DNA strands.
Performance Indicators		As documented through teacher observation -
Teacher:		
		At Level 1, the student is able to <ul style="list-style-type: none"> compare and contrast the processes of fossil formation; construct "mock" fossils using casts and molds; collect and/or observe various fossils and relate them to biogeographical changes; research careers that relate to biological evolution, such as farmers, field biologist, geologist, archeologist, epidemiologist, and anthropologist.
		At Level 2, the student is able to <ul style="list-style-type: none"> calculate the approximate age of a fossil, given the amount of Carbon 14 atoms found in the fossil and the half-life of C-14; compare and contrast the homologous and analogous structures of organisms to demonstrate relatedness; view embryos of different vertebrates to compare their early embryonic development to show relatedness; analyze a graph of the population distribution of peppered moths as their environment changed; predict the role of mutations in the survival of a population.
		At Level 3, the student is able to <ul style="list-style-type: none"> develop a diorama or time line that depicts change of organisms through time; collect data from local or regional records regarding population counts of a specific species found in the area and hypothesize what events might affect populations.

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